

CATALOG C

COPPER and BRASS PIPE and FITTINGS

STREAMLINE

TRADE MARK REG. U. S. PAT. OFF.

PRODUCTS

Mueller Brass Co.

PORT HURON, MICHIGAN

Three Generations of Brass Making

The Company

The Mueller Brass Company of Port Huron, Michigan, was incorporated in 1917 and during its industrial life has contributed some remarkable outstanding advances to industry. Immediately after the World War its executives had the vision to see the commercial possibilities in brass forgings which, previous to this time, were confined almost solely to the manufacture of munitions. Brass forgings today are one of the world's largest industries and the Mueller Brass Company is recognized as one of the world's largest manufacturers of this product. The Mueller Brass Company's contribution to the electric refrigeration industry has probably had more to do, than any other factor, in bringing it to the state of perfection that it has attained today.

In 1924 the Mueller Brass Company invented and marketed a product known as Mueller Copper Service Pipe and Fittings for waterworks service use. In a few short years this product has become

standard with an ever-growing number of waterworks systems throughout the United States and Canada.

The Mueller Brass Company's latest and most revolutionary advance for plumbing, heating and industrial uses is their product known internationally as Mueller STREAMLINE Copper Pipe and Fittings which are fully described and illustrated on the succeeding pages of this catalog.

Reliability

The Mueller Brass Company's rating in Bradstreet's and Dun's is over one million dollars—first grade of credit.

Complete control from virgin metal to finished product, including extensive engineering and laboratory facilities, is an outstanding feature in the Mueller organization. No new product is ever put upon the market without having successfully passed tests far beyond those which it would ever be called upon to withstand.



THREE GENERATIONS
OF BRASSMAKING

Mechanical Features of the New Mueller STREAMLINE Fitting

The new STREAMLINE Fitting invented by the Mueller Brass Company of Port Huron, Michigan, is the most revolutionary advance of the age to the development of plumbing and heating. It is a fitting made to be used by the plumber or steamfitter and requires a mechanic's skill and tools to connect. It is not intended for the jack-of-all-trades yet is readily installed by the experienced plumber or steamfitter.

The New Mueller STREAMLINE Fitting is threadless and is designed to make a conveniently soldered connection to Mueller STREAMLINE Copper Pipe for plumbing, heating and industrial uses.

The soldering is not done with a soldering iron. The fitting is heated with a blow torch after the pipe has been inserted and wire solder then introduced through a feed hole. No tinning whatever is required.

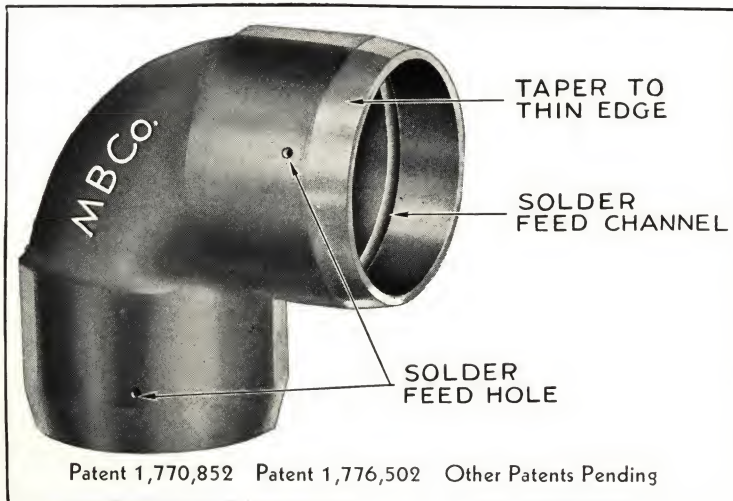
There are several distinct mechanical features utilized in the construction of Mueller STREAMLINE Fittings. The pipe openings in the fittings are machined to close tolerances and the copper pipe, when inserted in the fitting, fits snugly.

The distance to which the copper pipe may be inserted in the fitting has been carefully determined and made positive by a shoulder in the fitting itself against which the pipe rests. This shoulder is the same thickness as the pipe wall, thus insuring a continuous uninterrupted waterway that cuts flow resistance to a minimum. STREAMLINE Fittings are now furnished with the solder feed hole drilled.

The solder feed hole is located immediately above the solder feed channel (see illustration) so that when the solder is fed in after heating with a blow torch, it is carried around and evenly distributed in all directions by capillary attraction. The pipe is thus uniformly soldered to the fitting.

The tapered ends of the fittings, which are made with a thin edge, hasten the cooling of the solder at this point and form what is known to the trade as a solder gate.

A joint made with Mueller STREAMLINE Fittings to Mueller STREAMLINE Copper Pipe is, in contrast to all other methods of connecting, actually much stronger than the pipe itself.



The Phenomenon of Capillary Attraction The Basic Principle on Which a STREAMLINE Connection Is Made

The phenomenon of capillary attraction is really the basic principle on which the STREAMLINE Fitting is constructed. The successful application of this phenomenon in making connections with Mueller STREAMLINE Copper Pipe and Fittings depends upon close tolerances and clean surfaces. Mueller STREAMLINE Copper Pipe is designed for and intended to be used with Mueller STREAMLINE Fittings.

There is practically no limit to the height to which solder will rise by capillary attraction, depending upon proper working conditions and the uniform application of heat. Experiments conducted in our own laboratory have conclusively shown that it will rise at least a distance of two and one-half feet which is away and beyond anything that it would be required to do in actual practice.



Plumber making connection with Mueller STREAMLINE Fitting to Mueller Copper Pipe. Note the neat, compact appearance of the work

How a STREAMLINE Connection Is Made

The method of making a connection with a Mueller STREAMLINE Fitting to Mueller STREAMLINE Copper Pipe is by soldering, using Mueller STREAMLINE Solder, the blow torch and the application of the phenomenon of capillary attraction.

The fitting is placed on the pipe where required, after STREAMLINE Soldering flux has been applied, heated uniformly with the blow torch and STREAMLINE wire solder fed in at a conveniently drilled opening in the fitting for the purpose. The solder is drawn around evenly in the joint by capillary attraction and immediately becomes visible as a bright line at the point of junction where pipe and fitting join, conclusively indicating that a perfect joint has been completed. THIS IS THE ONLY JOINT THAT CAN BE VISUALLY INSPECTED DURING THE PROGRESS OF THE WORK FOR LEAKS. ACTUAL TESTING BECOMES A MERE FORMALITY.

Note this particular feature—The solder will flow up, down or laterally with equal facility and the operator can just as readily make a perfect joint by applying the solder through a solder feed hole located at the bottom of the fitting as he can if it is located at the top. There is no more difficulty in installing a pipe in the upper opening of a tee, for instance, than in the down or side outlets.

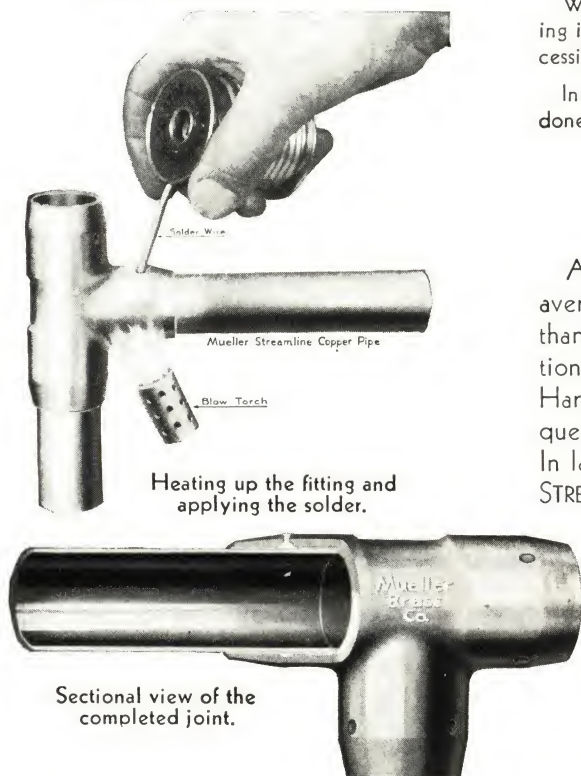
Connections Located in Places Difficult of Access

While the illustration on this page of the plumber making a connection shows him working in an almost ideal situation, there is very little trouble involved even in almost inaccessible places high up on walls or near the ceiling.

In the great majority of cases it is quite possible, after a little careful measuring has been done, to lay out and connect sections of the piping on the floor or bench.

Cost Comparisons

An installation of Mueller STREAMLINE Copper Pipe and Fittings in average residence buildings, in the great majority of cases, costs no more than a galvanized iron installation and costs a great deal less than an installation of brass pipe and fittings. It must be remembered that STREAMLINE Hard Copper Pipe is not connected by threading or flaring and consequently does not require the heavy wall of threaded brass or iron pipe. In larger buildings, however, such as hotels, large office buildings, etc., a STREAMLINE installation may cost somewhat more than an iron installation but considerably less than brass. If, however, the fact is taken into consideration that smaller sizes in STREAMLINE Copper Pipe can be used on hot water lines than corresponding service in iron, together with the high salvage value of the copper pipe, which is immediately re-usable for the same service, even after it has been in use for years, then the cost is very much lower.



Mueller STREAMLINE Copper Pipe and Fittings**Procedure for Making Joints**

1. Cut pipe square with STREAMLINE Pipe Cutter or fine hack saw (use 32 tooth saw preferably); use mill file to remove burr.

2. Using SANDPAPER or SANDCLOTH, rub outside of copper pipe around the end at least $1\frac{1}{2}$ to $2\frac{1}{2}$ inches until it becomes bright. Do not leave any dark spots.

3. Using SANDPAPER or SANDCLOTH, clean inside of fitting, where pipe goes into it, until surface becomes bright, thus removing any foreign substance.

4. Apply a light coat of Mueller Soldering flux to outside of pipe and inside of fitting. Be sure that the flux is distributed evenly. In extremely cold weather warm fitting slightly with torch to approximate room temperature (70 to 80 degrees).

5. Slip pipe into fitting until it will go no farther and turn back and forth once or twice to further insure an equal distribution of the flux.

6. Use only Mueller Special Solders as they are expressly prepared for this work. (See article in Mueller Catalog concerning special solders and fluxes.)

7. Using a blow torch, melt a drop of solder into the solder feed hole. Apply heat around the fitting until drop of solder disappears, indicating sufficient heat has been applied. Immediately remove torch and fill solder feed hole completely. If a complete ring of solder does not show all around at the junction between pipe and fitting, apply additional heat, and solder to the solder feed hole. Wipe off surplus solder and flux with cloth. If solder runs out too freely from between pipe and fitting, too much heat has been applied.

8. It is necessary on sizes larger than $1\frac{1}{4}$ in. to move the fitting on the pipe or tap with hammer when the solder starts in, to break the surface tension and to insure an equal distribution of solder.

9. When soldering large sizes, insert wooden plug in end of pipe to stop dissipation of heat.

Classification of STREAMLINE Copper Pipe

On account of the many varying conditions in actual use, the Mueller Brass Company, after many experiments and tests, now furnish STREAMLINE Copper Pipe in five classifications as follows:

Standard Hard STREAMLINE Copper Pipe is recommended for hot and cold water, air, etc., up to 200 lbs. operating pressure and on steam (saturated) up to *50 lbs. gauge. This pipe is not for bending (see below for soft pipe). It is for use with Mueller STREAMLINE Fittings. It is shipped boxed in straight lengths of 20 feet.

Heavy Hard STREAMLINE Copper Pipe is recommended for hot and cold water, air, etc., up to 300 lbs. operating pressure and on steam (saturated) up to *50 lbs. gauge. This pipe is not for bending (see below for soft pipe). It is for use with Mueller STREAMLINE Fittings. It is shipped boxed in straight lengths of 20 feet.

Extra-Heavy Hard STREAMLINE Copper Pipe is recommended for hot and cold water, air, etc., up to 500 lbs. operating pressure and on steam (saturated) up to *50 lbs. gauge. This pipe can be bent after annealing with a blow torch. It is for use with Mueller STREAMLINE Fittings. It is shipped boxed in straight lengths of 20 feet.

Pipe of the above classifications is of requisite stiffness for ease in handling and installing, particularly on new or exposed jobs.

Heavy Soft STREAMLINE Copper Pipe is recommended for all work requiring bends, flares, concealed replacements and repairs, for plumbing and heating, hot and cold water, compressed air and vacuum lines, for operating pressures up to 200 lbs. and on steam (saturated) up to *50 lbs. gauge. This pipe can be bent without annealing.

Extra-Heavy Soft STREAMLINE Copper Pipe is recommended for all work requiring bends, flares, concealed replacements and repairs, for plumbing and heating, hot and cold water, compressed air and vacuum lines, and for underground work, for operating pressure up to 300 lbs. and on steam (saturated) up to *50 lbs. gauge. This pipe can be bent without annealing.

On certain work where it is considered good practice to make bends in the pipe rather than to use elbows, **Heavy Soft** or **Extra-Heavy Soft** STREAMLINE Copper Pipe should be used.

When installing this pipe it is necessary to use the Mueller Sizing Tool. This pipe is shipped crated in coils of 30 to 60 ft. lengths up to and including 1 in. nominal pipe sizes or boxed in straight lengths of 20 feet.

*For steam pressures up to 15 lbs. use Mueller No. 50 solder and Mueller No. 50 flux. For steam pressures from 15 lbs. to 50 lbs. use Mueller No. 104 solder and No. 104 flux. For steam pressures in excess of 50 lbs. or for any special use, write Mueller Brass Co.

OUTSTANDING ADVANTAGES of Mueller STREAMLINE Copper Pipe and STREAMLINE Fittings

Elimination of Threaded Connections

Piping Systems commonly used in the past for plumbing and heating have required labor consuming threaded connections. The advent of the Mueller STREAMLINE Copper Pipe and Fittings is the first practical solution of a permanently tight, easily made soldered connection. By the elimination of the cut thread the strength of the tube or pipe is not reduced at the connections—the STREAMLINE Fitting and the completely soldered connection actually increase the strength of the piping system.

Permanence

Made of 99.90% pure copper, Mueller STREAMLINE Copper Pipe is permanently non-corroding except under extremely unfavorable conditions seldom encountered.

It is hard drawn and is shipped in 20-ft. straight lengths. Being hard drawn it retains its fine straight appearance and when installed there are no kinks, ripples or bends to spoil the effect.

It requires no more hangers or supports than an ordinary iron installation—it actually weighs less.

With soft copper pipe there is always the danger of driving nails through it during the process of lathing, etc. With Mueller STREAMLINE Hard Copper Pipe (Standard, Heavy and Extra-Heavy) tests conclusively show that its hard surface readily deflects nail points.

Installations of materials that rust away and corrode will, at best, last but a few years depending upon the nature of

the soil or water and will then have to be replaced. In many cases corrosion and rust will start almost immediately, gradually decreasing their service and cutting down the flow capacity. At the end of a few years they have no salvage value. An installation of Mueller STREAMLINE Copper Pipe and STREAMLINE Fittings will continue to give uninterrupted capacity service during the entire life of the building.

Conservation of Space in Construction

Space saving is of major importance to both architect and owner. STREAMLINE Copper Pipe and Fittings require approximately 30% less space than other materials owing to the fact that no room is required for wrench grip or swing necessitated by screwed fittings and that a STREAMLINE Fitting, although enormously strong, is little larger than the pipe itself. An installation of STREAMLINE Copper Pipe and Fittings can be placed close to walls, partitions or ceilings, and thus decreases space for vertical pipe shafts and horizontal pipe spaces.

Absence of Noise in STREAMLINE Installations

The smooth interior of the STREAMLINE Pipe and the absence of turmoil at the recessed fittings make for extreme quietness when water is running through it. This quality of silence is greatly desirable in residences, and particularly in apartment and hotel buildings where the noise created by water traveling through most piping systems is a source of considerable annoyance to people in adjoining rooms.

Tests

Expansion and Contraction—Several sections of $\frac{3}{4}$ -in. Mueller STREAMLINE Copper Pipe were connected with Mueller STREAMLINE couplings making a total length of 36 ft. containing 14 joints. Cold water was run through the Pipe for 15 seconds alternated with 100 lb. of steam at 339° F. This alternating test of steam and cold water was run continuously until 20,160 complete cycles had been effected. After a thorough inspection there was not the slightest sign of any damage or leak in the connection. This test was a very severe one and in view of the results obtained should satisfactorily answer any questions as to its dependability under service conditions.

Vibration—A test to determine the effect of continued vibration on connections made with Mueller STREAMLINE fittings to STREAMLINE Copper Pipe was conducted as follows:

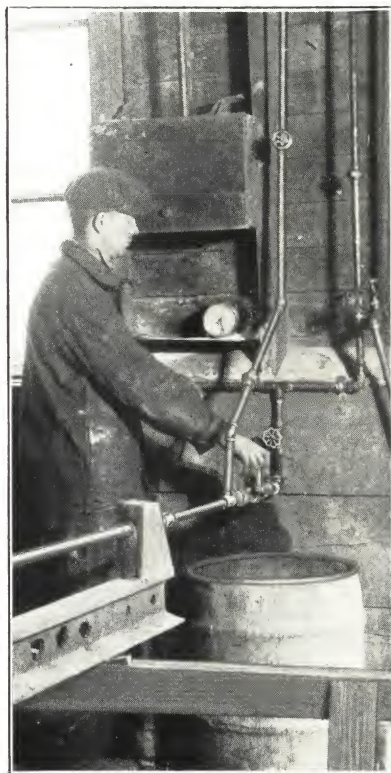
The test was run on a 10-ft. length of $\frac{3}{4}$ in. vertical pipe which contained nine joints; the lower end was held rigid. The upper end of the pipe was attached to a vibrator. The vibrator was set in motion and run continuously day and night for one week. The pipe was subjected to 850 vibrations per minute, totaling 8,568,000 vibrations over the test period with not the slightest sign of failure.

Tensile Strength—Two pieces of $\frac{3}{4}$ in. iron pipe were screwed into a coupling and pulled on the Olsen testing machine. Repeated experiments showed that the threads fractured at about 6,400 lbs.

Extra-heavy STREAMLINE Copper Pipe soldered into STREAMLINE coupling and subjected to the same test resulted in a fracture of the tube itself at slightly over 9,000 lbs. but showed not the slightest sign of joint failure.

Deflection or Bending—Two pieces of $\frac{3}{4}$ in. iron pipe size brass pipe 6 in. long were screwed into a coupling and placed over supports $5\frac{3}{8}$ in. center to center. A deflection test showed that the thread failed at $1\frac{1}{16}$ in. from horizontal.

The same test was carried out on two 6 in. pieces of Standard and Extra-Heavy STREAMLINE Copper Pipe and after being bent to a 45° angle the joint was still intact.



Illustrating method of alternating cold water and steam through STREAMLINE Copper Pipe in expansion and contraction test.



Vibration Test

Three Generations of Brass Making

Radiation and Heat Conservation

A Mueller STREAMLINE Copper Pipe and Fitting installation radiates very little heat and in hot water lines, steam lines, etc., can be very often installed **without insulation**.

Copper heating surfaces are widely used at present, especially in the form of finned tubes for convection heat transfer or as exemplified in the numerous types of automobile engine-cooling-radiators. It is interesting to note that without exception, when brass and copper surfaces are successfully used for heat transfer, the effective radiation area is necessarily greatly increased as by the use of fins, and a current of air must be kept steadily moving over such surfaces; this current being provided either by power driven fans or by natural convection such as may be effected by heated flues above the warm surfaces.

The users of the ultra modern concealed heaters built into the walls under the windows of so many residences have learned the extreme importance of the height of the heated flue or drafthead.

When air ceases to travel over the smooth surface of a heated copper pipe, heat transfer ceases to a great extent. If the heat transfer by radiation from an ideal black body is called 1.0 the corresponding heat transfer from polished is called 0.1. If the copper has been heavily oxidized even to the extent of becoming nearly black, its value is only .72. It is fair to say that a copper surface may radiate only about one-ninth as much heat as a corresponding unpainted steel surface such as that of a commercial pipe.

An important point to remember is the fact that the hot exposed surface areas of the thinner, smaller copper pipes will be much less in extent than that of ferrous piping. In the judgment of many experienced steam fitters and based on well authenticated installations which have passed through several heating seasons, the pipe sizes marked on the plans could be reduced at least one size throughout by using STREAMLINE Copper Pipe and Fittings. This is largely due to the smooth interior of the pipe, the absence of clogging rust and slimy accumulations and to the elimination of turmoil at the recessed fittings. This reduction in size represents, of course, a material saving in costs.

According to information published by the Copper and Brass Extended Uses Council of Great Britain, a copper pipe 100 feet long having a $\frac{3}{8}$ inch bore, and .447 inch outside diameter, requires 237 B.t.u.'s to heat up from 60°

F. to 200° F., as compared with 1450 B.t.u.'s to heat 100 feet of iron pipe of $\frac{1}{2}$ inch bore and .840 inch outside diameter, to the same temperature. This conservation of heat in combination with the low radiation and smaller exposed area, is equivalent to a saving of one ton of coal per annum for every 100 feet of copper pipe used.

It must be remembered that although copper pipe surfaces radiate very little heat, copper itself is a very rapid conductor of heat. Therefore it naturally follows that there is considerably less loss of heat when being conveyed from the point of generation to the points of distribution.

The advantages mentioned above, together with the fact that there is no room required for a wrench grip and that the fitting itself is very little larger than the pipe, permits of it being installed closer to partitions and walls. In making a connection close to walls, ceiling or partition, the mechanic can readily overcome the objectionable features of scorching with the blow torch by using a thin sheet of asbestos on a simple wire bracket hooked around the pipe.

A STREAMLINE Installation

Permits the Use of Smaller Radiator Connections on Hot Water Heating

Since the shoulder inside a STREAMLINE Fitting against which the pipe rests, is the same thickness as the pipe wall, a smooth, uniform, uninterrupted waterway or bore is maintained. In addition, copper pipe does not clog or rust and the original flow capacity remains the same.

These qualities permit the use of the following sizes of radiator connections for hot water heating:

Radiator Tappings	First Story	Second Story
$\frac{3}{8}$ "	0- 25 sq. ft.	0- 30 sq. ft.
$\frac{1}{2}$ "	26- 60 sq. ft.	31- 90 sq. ft.
$\frac{3}{4}$ "	61-100 sq. ft.	91-125 sq. ft.

The size of mains must be equal to or larger in cross section than the area of all the branches, workmanship must be first class and adjustable radiator valves must be used.

Under these conditions STREAMLINE Hard Copper Pipe and Fittings in the above sizes will provide ample water circulation.

For Repair and Replacement Work

An installation of STREAMLINE Copper Pipe and Fittings cannot rust. They are ideal for replacement work and when once installed, last a lifetime without further attention.

The cost of STREAMLINE Copper Pipe and Fittings is approximately the same as iron but costs very much less than iron in repair jobs, owing to the fact that it is not necessary to tear up large areas of wall and flooring to make a replacement. The removal of a base or floor board is generally all that is necessary.

Mueller **Heavy Soft** and **Extra-Heavy Soft** STREAMLINE Copper Pipe is pliable enough to be easily bent and worked around projections. It may be readily run between studding, over or under electric conduits, by manipulating and bending the pipe in almost the same way as an electrician

installs an electric cable. A STREAMLINE installation requires less room than any other material for the same purpose. A STREAMLINE joint is the Strongest Part of the Installation and no apprehension need be felt concerning future leakage at these points.

STREAMLINE Copper Pipe is provided in both hard and soft tempers and there are jobs where either or both may be used to very good advantage. Mueller **Standard Hard**, **Heavy Hard** and **Extra-Heavy Hard** STREAMLINE Copper Pipe are particularly suitable on some of the larger jobs where utility corridors or large partition areas are available. In these cases, straight length runs are easily handled and the compactness of the STREAMLINE Fitting, which is very slightly larger than the pipe itself, makes an exceptionally handsome job.

Three Generations of Brass Making

Mueller STREAMLINE Fittings



STREAMLINE 90° Elbow
Copper to Copper

This Elbow is furnished in sizes from $\frac{1}{4}$ to 6 in. inclusive.

IMPORTANT
All Mueller STREAMLINE Fittings are fully covered by U.S. Patents granted.
Nos. { 1,770,852
1,776,502
Other patents have been applied for.

Note
STREAMLINE Fittings are furnished with the solder feed hole drilled.



STREAMLINE Coupling
Copper to Copper

Furnished in sizes from $\frac{1}{4}$ to 6 in. inclusive.
General Information on Mueller STREAMLINE Copper to Copper Couplings

These are provided with an internal stop or boss situated midway from the two pipe openings. This makes positive the distance to which pipe may be inserted in the fitting. To use the connection as a union coupling, stop can be flattened by placing over a rounded surface such as a pipe or chisel and striking a few light blows with hammer.



STREAMLINE 90° Elbow
Copper to Outside I.P.S.

This Elbow is furnished in sizes from $\frac{1}{4}$ to 6 in. inclusive.



STREAMLINE Coupling
Copper to Outside I.P.S.

This Coupling is furnished in sizes from $\frac{1}{4}$ to 6 in. inclusive.



STREAMLINE 90° Elbow
Copper to Inside I.P.S.
Furnished in sizes from $\frac{3}{8}$ to 4 in. inclusive.



STREAMLINE 45° Elbow
Copper to Copper
Furnished in sizes from $\frac{3}{8}$ to 6 in. inclusive.



STREAMLINE Coupling
Copper to Inside I.P.S.
Furnished in sizes from $\frac{1}{4}$ to 2 in. inclusive.

Three Generations of Brass Making

Mueller STREAMLINE Fittings

Patent Nos. 1,770,852 and 1,776,502

(Other Patents Applied For)

**STREAMLINE Tee**

Copper to Copper to Copper

This Tee is furnished in sizes from $\frac{1}{4}$ to 6 in. incl.**STREAMLINE Tee**

Copper to Copper to Inside I.P.S.

Furnished in sizes from $\frac{3}{8}$ to 2 in. inclusive.

Inside I.P.S. to Copper to Copper

Furnished in the following sizes:

 $\frac{1}{2}$ " inside I.P.S. x $\frac{1}{2}$ " c. x $\frac{1}{2}$ " c. $\frac{3}{4}$ " inside I.P.S. x $\frac{3}{4}$ " c. x $\frac{3}{4}$ " c.**STREAMLINE Crosses**

Copper to Copper

Furnished in the following sizes:

 $1" \times 1" \times 1" \times 1"$ $2" \times 2" \times 2" \times 2"$ $1\frac{1}{4}" \times 1\frac{1}{4}" \times 1\frac{1}{4}" \times 1\frac{1}{4}"$ $2\frac{1}{2}" \times 2\frac{1}{2}" \times 2\frac{1}{2}" \times 2\frac{1}{2}"$ $1\frac{1}{2}" \times 1\frac{1}{2}" \times 1\frac{1}{2}" \times 1\frac{1}{2}"$ $3" \times 3" \times 3" \times 3"$ **STREAMLINE Fitting Nipple**

Fitting to Outside I. P. S.

Furnished in sizes from $\frac{3}{8}$ to 6 in. inclusive**STREAMLINE Fitting Coupling**

Fitting to Inside I. P. S.

This coupling is furnished in sizes from $\frac{3}{8}$ to $2\frac{1}{2}$ in. inclusive $\frac{3}{8}"$ to $\frac{3}{8}"$ $\frac{1}{2}"$ to $\frac{1}{2}"$ or $\frac{3}{8}"$ $\frac{3}{4}"$ to $\frac{3}{4}"$ or $\frac{1}{2}"$ $1"$ to $1"$ or $\frac{3}{4}"$ $1\frac{1}{4}"$ to $1\frac{1}{4}"$ $1\frac{1}{2}"$ to $1\frac{1}{2}"$ or $1\frac{1}{4}"$ $2"$ to $2"$ $2\frac{1}{2}"$ to $2\frac{1}{2}"$ **STREAMLINE 90°
Street Elbow**

Fitting to Copper

Furnished in sizes:

 $\frac{1}{2}" \times \frac{1}{2}"$, $\frac{3}{4}" \times \frac{3}{4}"$ and $1" \times 1"$ **STREAMLINE Bushings Fitting
to Copper
SIZES** $\frac{3}{8}"$ to $\frac{1}{4}"$ $\frac{1}{2}"$ to $\frac{3}{8}"$ or $\frac{1}{4}"$ $\frac{3}{4}"$ to $\frac{1}{2}"$ or $\frac{3}{8}"$ $1"$ to $\frac{3}{4}"$ or $\frac{1}{2}"$ $1\frac{1}{4}"$ to $1"$, $\frac{3}{4}"$ or $\frac{1}{2}"$ $1\frac{1}{2}"$ to $1\frac{1}{4}"$, $1"$ or $\frac{3}{4}"$ $2"$ to $1\frac{1}{2}"$, $1\frac{1}{4}"$ or $1"$ $2\frac{1}{2}"$ to $2"$, $1\frac{1}{2}"$ or $1\frac{1}{4}"$ $3"$ to $2\frac{1}{2}"$, $2"$ or $1\frac{1}{2}"$ $4"$ to $3"$, $2\frac{1}{2}"$ or $2"$ **STREAM-
LINE
45°
Street Elbow**

Fitting to Copper

Furnished in sizes:

 $\frac{1}{2}" \times \frac{1}{2}"$, $\frac{3}{4}" \times \frac{3}{4}"$, and $1" \times 1"$ **Three Generations of Brass Making**

Mueller STREAMLINE Fittings

Patents Nos. 1,770,852 and 1,776,502
(Other Patents Applied For)



STREAMLINE Drop Ear Tee
Copper to Copper to Inside I.P.S.
 $\frac{1}{2}$ " C. x $\frac{1}{2}$ " C. x $\frac{1}{2}$ " Inside I.P.S.
 $\frac{1}{2}$ " C. x $\frac{1}{2}$ " C. x $\frac{3}{8}$ " Inside I.P.S.

Copper to Copper to Copper
 $\frac{1}{2}$ " to $\frac{1}{2}$ " to $\frac{1}{2}$ ", and $\frac{3}{4}$ " to $\frac{3}{4}$ " to $\frac{3}{4}$ "



STREAMLINE Drop Ear Elbow

Copper to Inside I.P.S.

$\frac{3}{8}$ " x $\frac{3}{8}$ " $\frac{1}{2}$ " x $\frac{3}{8}$ "
 $\frac{1}{2}$ " x $\frac{1}{2}$ " $1\frac{1}{4}$ " x 1"

Copper to Copper

$\frac{3}{8}$ " to $\frac{3}{8}$ ", $\frac{1}{2}$ " to $\frac{1}{2}$ ", and $\frac{3}{4}$ " to $\frac{3}{4}$ "



STREAMLINE Plug
Sizes from $\frac{1}{4}$ to 2 in.
inclusive.



STREAMLINE Cap
Sizes from $\frac{1}{4}$ to 6 in. inclusive.



STREAMLINE Eccentric Coupling

Copper to Copper

$\frac{3}{4}$ " x $\frac{1}{2}$ "	2" x $1\frac{1}{2}$ "	$3\frac{1}{2}$ " x $2\frac{1}{2}$ "
$1\frac{1}{4}$ " x $\frac{3}{4}$ "	2" x $1\frac{1}{4}$ "	4" x $3\frac{1}{2}$ "
$1\frac{1}{4}$ " x $\frac{3}{4}$ "	$2\frac{1}{2}$ " x 2"	4" x 3"
$1\frac{1}{4}$ " x 1"	3" x $2\frac{1}{2}$ "	5" x 4"
$1\frac{1}{2}$ " x $1\frac{1}{4}$ "	3" x 2"	6" x 5"
	$3\frac{1}{2}$ " x 3"	



90° Range Boiler Elbow

STREAMLINE Range Boiler Fittings
STREAMLINE Range Boiler Couplings, and 90°
Elbows are furnished in the following sizes:

$\frac{3}{4}$ " Copper x 1" Outside I.P.S. x $\frac{3}{4}$ " Inside I.P.S.
Coupling or Elbow
 $\frac{1}{2}$ " Copper x 1" Outside I.P.S. x $\frac{1}{2}$ " Inside I.P.S.
Coupling or Elbow
 $\frac{3}{4}$ " Copper x 1" Outside I.P.S. x $\frac{1}{2}$ " Inside I.P.S.
Coupling or Elbow



Range Boiler Coupling

Hard STREAMLINE Copper Expansion Loops and Bends

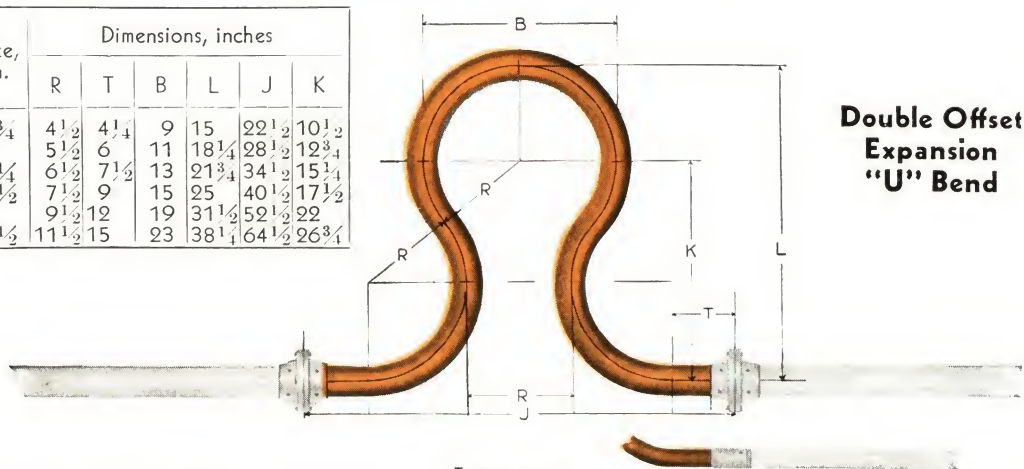
The loops and bends illustrated herewith are particularly designed to take care of a large percentage of low pressure heating requirements on STREAMLINE installations and are shipped from stock.

Note that Double Offset Expansion U Bends as shown below in figures 126 and 127 are designed to take care of $1\frac{1}{4}$ in. of expansion when set in place without springing. These allow sufficient movement for an ordinary run of 100 ft. of pipe, either steam or return lines. Twice

this movement may be obtained by springing open $1\frac{1}{4}$ in. when assembling.

All STREAMLINE Expansion loops, bends, sweeps, offsets and return bends are made from Mueller Extra, Heavy Hard STREAMLINE Copper Pipe.

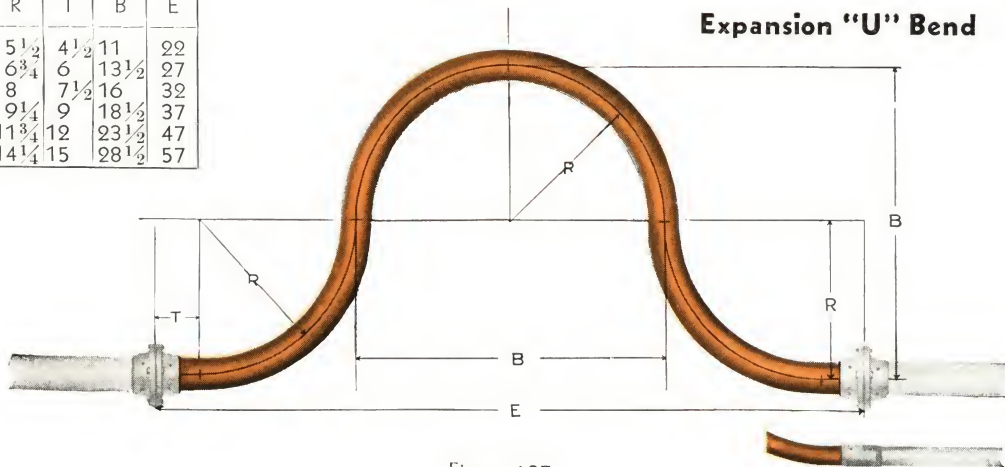
Part No.	Size, in.	Dimensions, inches					
		R	T	B	L	J	K
A-3100	$\frac{3}{4}$	$4\frac{1}{2}$	$4\frac{1}{4}$	9	15	$22\frac{1}{2}$	$10\frac{1}{2}$
A-3101	1	$5\frac{1}{2}$	6	11	$18\frac{1}{4}$	$28\frac{1}{2}$	$12\frac{3}{4}$
A-3102	$1\frac{1}{4}$	$6\frac{1}{2}$	$7\frac{1}{2}$	13	$21\frac{3}{4}$	$34\frac{1}{2}$	$15\frac{1}{4}$
A-3103	$1\frac{1}{2}$	$7\frac{1}{2}$	9	15	25	$40\frac{1}{2}$	$17\frac{1}{2}$
A-3104	2	$9\frac{1}{2}$	12	19	$31\frac{1}{2}$	$52\frac{1}{2}$	22
A-3105	$2\frac{1}{2}$	$11\frac{1}{2}$	15	23	$38\frac{1}{4}$	$64\frac{1}{2}$	$26\frac{3}{4}$



**Double Offset
Expansion
"U" Bend**

Figure 126

Part No.	Size, in.	Dimensions, inches			
		R	T	B	E
A-3106	$\frac{3}{4}$	$5\frac{1}{2}$	$4\frac{1}{2}$	11	22
A-3107	1	$6\frac{3}{4}$	6	$13\frac{1}{2}$	27
A-3108	$1\frac{1}{4}$	8	$7\frac{1}{2}$	16	32
A-3109	$1\frac{1}{2}$	$9\frac{1}{4}$	9	$18\frac{1}{2}$	37
A-3110	2	$11\frac{3}{4}$	12	$23\frac{1}{2}$	47
A-3111	$2\frac{1}{2}$	$14\frac{1}{4}$	15	$28\frac{1}{2}$	57



Expansion "U" Bend

Figure 127



STANDARD COMPANION FLANGES

Patents Nos. 1,770,852 and 1,776,502

(Other Patents Applied For)

Sizes—2, $2\frac{1}{2}$, 3, $3\frac{1}{2}$, 4, 5, and 6 in.

The STREAMLINE companion flange (illustrated) offers several important advantages over brass or ferrous pipe installations. They permit an easy, inexpensive installation because of the absence of threads which are difficult to cut in the larger sizes. On account of the ease with which lengths may be figured and cut they save time and patching at the finishing section of any companion flange installation. When pipe lines must be removed STREAMLINE installations come down as readily as they go up and troubles arising through taking apart corroded threaded joints with frequent breakage and added expense are eliminated. This feature does much toward the further elimination of costly delays.

Three Generations of Brass Making

STREAMLINE Copper Sweeps, Offsets and Return Bends

These items are standardized for STREAMLINE Installations and are shipped from stock.

Quarter Bend

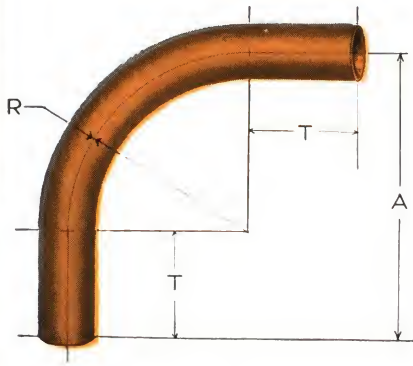


Figure 128

Eighth Bend

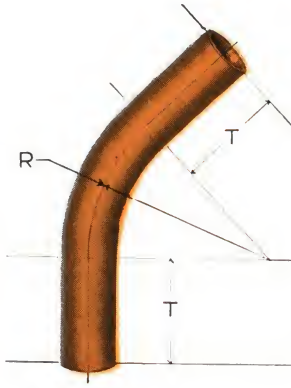


Figure 129

Return Bend

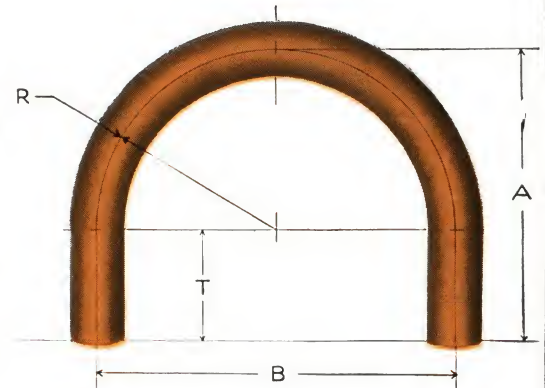


Figure 130

Offsets will prove extremely convenient in many locations.

They have been developed to meet the requirements of most STREAMLINE installations and are made from Extra-Heavy Hard STREAMLINE Copper Pipe.

Shipment from stock.

Fig. 128 Part No.	Fig. 129 Part No.	Fig. 130 Part No.	Nom. Size	R	T	A	B
A-3112	A-3119	A-3126	1/2"	3 1/2"	3"	6 1/2"	7"
A-3113	A-3120	A-3127	3/4"	4 1/2"	4 1/2"	9"	9"
A-3114	A-3121	A-3128	1"	5 1/2"	6"	11 1/2"	11"
A-3115	A-3122	A-3129	1 1/4"	6 1/2"	7 1/2"	14"	13"
A-3116	A-3123	A-3130	1 1/2"	7 1/2"	9"	16 1/2"	15"
A-3117	A-3124	A-3131	2"	9 1/2"	12"	21 1/2"	19"
A-3118	A-3125	A-3132	2 1/2"	11 1/2"	15"	26 1/2"	23"

Offset

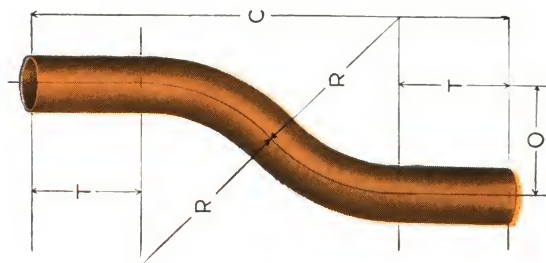


Figure 131

Part No.	Nom. Size	Amt. of Offset "O"	Length "C"	R	T
A-3133	1/2"	1 1/2"	10 1/2"	3 1/2"	3"
A-3134	1/2"	3"	11 3/4"	3 1/2"	4 1/2"
A-3135	3/4"	1 1/2"	14"	4 1/2"	4 1/2"
A-3136	1"	1 1/2"	17 1/2"	5 1/2"	6"
A-3137	1"	3"	19 1/2"	5 1/2"	6"
A-3138	1 1/4"	1 1/2"	21"	6 1/2"	7 1/2"
A-3139	1 1/4"	3"	23 1/2"	6 1/2"	7 1/2"
A-3140	1 1/2"	2"	25 1/2"	7 1/2"	9"
A-3141	1 1/2"	4"	28"	7 1/2"	9"
A-3142	2"	2"	32 1/2"	9 1/2"	12"
A-3143	2"	4"	35 1/2"	9 1/2"	12"
A-3144	2 1/2"	2"	39 1/4"	11 1/2"	15"
A-3145	2 1/2"	4"	43"	11 1/2"	15"



Catalog No. A-11130

STREAMLINE Range Boiler Dip Tube

Mueller STREAMLINE Range Boiler Dip Tubes are made from Standard Hard STREAMLINE Copper Pipe and are 54 in. in length. They are attached to a 1/2 in. outside I. P. S. Bushing thus permitting their general use. They are recommended also for use in connection with STREAMLINE Range Boiler Fittings which thread directly into the range boiler and provide a STREAMLINE outlet in addition to the STREAMLINE I. P. S. thread to receive the dip tube.

Architect's Specifications for Mueller STREAMLINE Copper Pipe and Copper Fittings

No. 101

Standard Hard STREAMLINE Copper Pipe and Fittings

For Pressures Up To 200 Pounds
For Heating, Plumbing and Industrial Uses

1. All plumbing and heating, hot and cold water, compressed air and vacuum lines for pressures up to 200 pounds and saturated steam up to 50 pounds (gauge)*, up to and including 6 inch shall be **Standard Hard STREAMLINE Copper Pipe**.
2. The pipe shall be made from deoxidized copper, and shall analyze not less than 99.9% copper, and shall withstand a hydrostatic test of 6000 pounds per square inch fibre stress.
All fittings are for pressures up to 200 pounds and shall withstand a 75 pound air pressure test under water, for porosity.
3. The **Standard Hard STREAMLINE Copper Pipe and Fittings** shall be manufactured by the Mueller Brass Co., Port Huron, Michigan.
4. Weights and Dimensions of **Standard Hard STREAMLINE Copper Pipe**.

Nominal Size, In.	Wall Thickness, In.	Pounds per Lineal Foot	O. D. Tolerance
$\frac{1}{8}$	.025	.068	.250 + or - .001
$\frac{1}{4}$	.025	.106	.375 + or - .001
$\frac{3}{8}$	.025	.144	.500 + or - .001
$\frac{1}{2}$	.028	.203	.625 + or - .001
$\frac{3}{4}$	.032	.328	.875 + or - .001
1	.035	.464	1.125 + or - .0015
$1\frac{1}{4}$	.042	.681	1.375 + or - .0015
$1\frac{1}{2}$	.049	.940	1.625 + or - .002
2	.058	1.46	2.125 + or - .002
$2\frac{1}{2}$	.065	2.03	2.625 + or - .002
3	.072	2.68	3.125 + or - .002
$3\frac{1}{2}$	.083	3.58	3.625 + or - .002
4	.095	4.66	4.125 + or - .002
5	.109	6.65	5.125 + or - .002
6	.120	8.77	6.125 + or - .002

5. No pipe exceeding the O. D. tolerance shown will be accepted.
The weight of the pipe shall vary not more than 5% from the weight specified.
The thickness at any point shall not be less than that specified by more than 5%.
- 6.* Joints with STREAMLINE Fittings and STREAMLINE Copper Pipe must be made with solders and non-corrosive fluxes as supplied by the Mueller Brass Co.

No. 106

Heavy Hard STREAMLINE Copper Pipe and Fittings

For Pressures Up To 300 Pounds
For Heating, Plumbing and Industrial Uses

1. All plumbing and heating, hot and cold water, compressed air and vacuum lines for pressures up to 300 pounds and saturated steam up to 50 pounds (gauge)* up to and including 2 inch shall be **Heavy Hard STREAMLINE Copper Pipe**.
2. The pipe shall be made from deoxidized copper and shall analyze not less than 99.9% copper, and shall withstand a hydrostatic test of 6000 pounds per square inch fibre stress.
All fittings are for pressures up to 300 pounds and shall withstand a 75 pound air pressure test under water for porosity.
3. The **Heavy Hard STREAMLINE Copper Pipe and Fittings** shall be manufactured by the Mueller Brass Co., Port Huron, Michigan.
4. Weights and Dimensions of **Heavy Hard STREAMLINE Copper Pipe**.

Nominal Size, In.	Wall Thickness, In.	Pounds per Lineal Foot	O. D. Tolerance
$\frac{3}{8}$	.035	.198	.500 + or - .001
$\frac{1}{2}$	.040	.284	.625 + or - .001
$\frac{3}{4}$	.045	.454	.875 + or - .001
1	.050	.653	1.125 + or - .0015
$1\frac{1}{4}$	.055	.882	1.375 + or - .0015
$1\frac{1}{2}$	.060	1.141	1.625 + or - .002
2	.070	1.748	2.125 + or - .002

5. No pipe exceeding the O. D. tolerance shown will be accepted.
The weight of the pipe shall vary not more than 5% from the weight specified.
The thickness at any point shall not be less than that specified by more than 5 per cent.
- 6.* Joints with STREAMLINE Fittings and STREAMLINE Copper Pipe must be made with solders and non-corrosive fluxes as supplied by the Mueller Brass Co.

*Mueller STREAMLINE Solders and Fluxes

The Mueller Brass Co. supplies special wire solder and fluxes for making connections with STREAMLINE Copper Pipe and Fittings, depending upon the temperatures encountered in service. They were selected after experiments and tests as the best materials for their particular use. If solders and fluxes other than those recommended were used and defective work resulted, the blame might be unjustly attributed to STREAMLINE pipe and fittings.

GENERAL USES FOR SPECIFYING

For steam pressures up to 15 lbs., specify Mueller No. 50 solder and Mueller No. 50 Flux.

For steam pressures from 15 to 50 lbs. specify Mueller No. 104 Solder and Mueller No. 104 Flux.

For steam pressures in excess of 50 lbs., or for any special use, write Mueller Brass Co.

No. 102 Extra-Heavy Hard STREAMLINE Copper Pipe and Fittings

For Pressures Up To 300 Pounds
For Heating, Plumbing and Industrial Uses

1. All plumbing and heating, hot and cold water, compressed air and vacuum lines for pressures up to 500 pounds, and saturated steam up to 50 pounds (gauge)*, up to and including 6 inch, shall be **Extra-Heavy Hard STREAMLINE Copper Pipe**.
2. The pipe shall be made from deoxidized copper, and shall analyze not less than 99.9% copper, and shall withstand a hydrostatic test of 6000 pounds per square inch fibre stress.
Standard fittings up to 1 1/4 inch, and Extra-Heavy fittings over 1 1/4 inch are for pressures up to 500 pounds, and shall withstand a 75 pound air pressure test under water, for porosity.
3. The **STREAMLINE Extra Heavy Hard Copper Pipe and Fittings** shall be manufactured by the Mueller Brass Co., Port Huron, Michigan.
4. Weights and Dimensions of **Extra-Heavy Hard STREAMLINE Copper Pipe**.

Nominal Size, In.	Wall Thickness, In.	Pounds per Lineal Foot	O. D. Tolerance
1/8	.032	.085	.250 + or - .001
1/4	.032	.134	.375 + or - .001
3/8	.049	.269	.500 + or - .001
1/2	.049	.343	.625 + or - .001
3/4	.065	.640	.875 + or - .001
1	.065	.838	1.125 + or - .0015
1 1/4	.065	1.04	1.375 + or - .0015
1 1/2	.072	1.36	1.625 + or - .002
2	.083	2.06	2.125 + or - .002
2 1/2	.095	2.92	2.625 + or - .002
3	.109	4.00	3.125 + or - .002
3 1/2	.120	5.12	3.625 + or - .002
4	.134	6.51	4.125 + or - .002
5	.148	8.75	5.125 + or - .002
6	.165	11.96	6.125 + or - .002

5. No pipe exceeding the O. D. tolerance shown will be accepted.
The weight of the pipe shall vary not more than 5% from the weight specified.
The thickness at any point shall not be less than that specified by more than 5 per cent.
6. Joints with **STREAMLINE Fittings and STREAMLINE Copper Pipe** must be made with solders and non-corrosive fluxes as supplied by the Mueller Brass Co.

No. 107—Heavy-Soft STREAMLINE Copper Pipe and Fittings

For Pressures Up To 200 Pounds
For Bends, Flares, Underground Work, Repairs and Replacements

1. All work requiring a flexible pipe for bends, flares, concealed replacements and repairs, for plumbing and heating, hot and cold water, compressed air and vacuum lines and for underground, for pressures up to 200 pounds, and saturated steam up to 50 pounds (gauge)*, up to and including 2 inch, shall be **Heavy Soft STREAMLINE Copper Pipe**.
2. The pipe shall be made from deoxidized copper and shall analyze not less than 99.9% copper, and shall withstand a hydrostatic test of 6000 pounds per square inch fibre stress.
All fittings are for pressures up to 200 pounds and shall withstand a 75 pound air pressure test under water for porosity.
3. The **Heavy Soft STREAMLINE Copper Pipe and Fittings** shall be manufactured by the Mueller Brass Co., Port Huron, Michigan.
- 4.** The O. D. Tolerance of the pipe may vary from that specified, due to the soft temper. Sizing tools, manufactured by the Mueller Brass Co., should be used to insure a perfect fit for each joint prior to soldering.
The weight of the pipe shall vary not more than 5% from the weight specified.

No. 103 Extra-Heavy Soft STREAMLINE Copper Pipe and Fittings

For Pressures Up To 300 Pounds
For Bends, Flares, Underground Work, Repairs and Replacements

1. All work requiring a flexible pipe for bends, flares, concealed replacements and repairs, for plumbing and heating, hot and cold water, compressed air and vacuum lines and for underground, for pressures up to 300 pounds, and saturated steam up to 50 pounds (gauge)*, up to and including 2 inch, shall be **Extra-Heavy Soft STREAMLINE Copper Pipe**.
2. The pipe shall be made from deoxidized copper, and shall analyze not less than 99.9% copper, and shall withstand a hydrostatic test of 6000 pounds per square inch fibre stress.
All fittings are for pressures up to 300 pounds and shall withstand a 75 pound air pressure test under water, for porosity.
3. The **Extra-Heavy Soft STREAMLINE Copper Pipe and Fittings** shall be manufactured by the Mueller Brass Co., Port Huron, Michigan.
4. Weights and Dimensions of **Extra-Heavy Soft STREAMLINE Copper Pipe**.

Nominal Size, In.	Wall Thickness, In.	Pounds per Lineal Foot	O. D. Tolerance**
1/8	.032	.085	.250 + or - .001
1/4	.032	.134	.375 + or - .001
3/8	.049	.269	.500 + or - .001
1/2	.049	.343	.625 + or - .001
3/4	.065	.640	.875 + or - .001
1	.065	.838	1.125 + or - .0015
1 1/4	.065	1.04	1.375 + or - .0015
1 1/2	.072	1.36	1.625 + or - .002
2	.083	2.06	2.125 + or - .002

- 5.** The O.D. tolerance of the pipe may vary from that specified, due to the soft temper. Sizing tools, manufactured by the Mueller Brass Co., should be used to insure a perfect fit for each joint prior to soldering.
The weight of the pipe shall vary not more than 5 per cent from the weight specified.
The thickness at any point shall not be less than that specified by more than 5 per cent.
6. Joints with **STREAMLINE Fittings and STREAMLINE Copper Pipe** must be made with solders and non-corrosive fluxes as supplied by the Mueller Brass Co.

Nominal Size, In.	Wall Thickness, In.	Pounds per Lineal Foot	O. D. Tolerance**
3/8	.035	.198	.500 + or - .001
1/2	.040	.284	.625 + or - .001
3/4	.045	.454	.875 + or - .001
1	.050	.653	1.125 + or - .0015
1 1/4	.055	.882	1.375 + or - .0015
1 1/2	.060	1.141	1.625 + or - .002
2	.070	1.748	2.125 + or - .002

See page 3 for classification and uses.

*See page 11 for solders and fluxes.

Relative Discharge Capacity Mueller STREAMLINE Copper Pipe

This is a table similar to those long established for use with iron pipe sizes when figuring capacities of mains for many branches or laterals. It does not take into account, pressure drop due to wall friction, elbows, etc., nor does it have anything to do with velocities.

In effect—you may have eight $\frac{3}{4}$ in. laterals; therefore follow down the column under $\frac{3}{4}$ in. until you come to an

approximation of the eight; in this case between 6.14 and 9.47. Your main then will be 2 or $2\frac{1}{2}$ in. depending entirely on the class of service.

Since such a table is written around the idea that ALL LATERALS ARE WORKING TO CAPACITY AT THE SAME TIME, it is more or less of a generality and good judgment should, of course, be used.

Standard Hard STREAMLINE Copper Pipe

Nominal Pipe Size, In.	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	5	6
$\frac{1}{4}$	1													
$\frac{3}{8}$	1.92	1												
$\frac{1}{2}$	3.06	1.60	1											
$\frac{3}{4}$	6.23	3.25	2.03	1										
1	10.5	5.50	3.43	1.69	1									
$1\frac{1}{4}$	15.8	8.23	5.15	2.53	1.50	1								
$1\frac{1}{2}$	22.1	11.5	7.20	3.55	2.09	1.40	1							
2	38.2	19.9	12.5	6.14	3.63	2.42	1.73	1						
$2\frac{1}{2}$	59	30.8	19.2	9.48	5.59	3.74	2.67	1.54	1					
3	84	43.9	27.4	13.5	7.98	5.33	3.81	2.20	1.43	1				
$3\frac{1}{2}$	113	59	36.9	18.2	10.8	7.18	5.13	2.96	1.92	1.35	1			
4	147	77	48.8	23.6	13.9	9.39	6.64	3.84	2.49	1.74	1.29	1		
5	228	119	74	36.6	21.6	14.5	10.3	5.97	3.87	2.71	2.01	1.56	1	
6	328	171	107	53	31.1	20.8	14.9	8.58	5.56	3.89	2.90	2.24	1.44	1

Heavy Hard and Heavy Soft STREAMLINE Copper Pipe

Nominal Pipe Size, In.	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
$\frac{3}{8}$	1						
$\frac{1}{2}$	1.61	1					
$\frac{3}{4}$	3.34	2.08	1				
1	5.69	3.54	1.71	1			
$1\frac{1}{4}$	8.68	5.40	2.60	1.53	1		
$1\frac{1}{2}$	12.3	7.64	3.68	2.16	1.42	1	
2	21.4	13.3	6.40	3.75	2.46	1.74	1

Extra Heavy Hard and Extra Heavy Soft STREAMLINE Copper Pipe

Nominal Pipe Size, In.	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4
$\frac{1}{4}$	1												
$\frac{3}{8}$	1.64	1											
$\frac{1}{2}$	2.83	1.72	1										
$\frac{5}{8}$	4.33	2.63	1.53	1									
$\frac{3}{4}$	5.67	3.43	2.00	1.31	1								
1	10.1	6.13	3.57	2.33	1.79	1							
$1\frac{1}{4}$	15.8	9.58	5.58	3.65	2.79	1.57	1						
$1\frac{1}{2}$	22.4	13.6	7.91	5.16	3.95	2.22	1.42	1					
2	39.1	23.7	13.8	9.03	6.92	3.88	2.48	1.75	1				
$2\frac{1}{2}$	60.4	36.8	21.4	13.9	10.7	6.00	3.84	2.71	1.55	1			
3	86	52	30.5	19.9	15.2	8.52	5.45	3.85	2.20	1.43	1		
$3\frac{1}{2}$	117	71	41.3	26.9	20.6	11.6	7.39	5.22	2.98	1.93	1.36	1	
4	152	92	53	35.0	26.8	15.0	9.6	6.78	3.88	2.51	1.76	1.30	1

General Properties of Mueller STREAMLINE Copper Pipe

Nominal Pipe Size, In.	Outside Diameter, In.	Stubbs Gauge	Decimal Equivalent or Wall Thickness	Actual Inside Diameter, In.	Calculated Bursting Pressure, * Lbs.	Safe Working Pressure Factor of 6, lbs.	Actual I. D. Area, Sq. In.	Actual Net Copper Area, Sq. In.	Ultimate Strength in Tension, lb.	Gals. Discharge Per Minute **	Weight Per Foot, Pounds
Standard Hard STREAMLINE Copper Pipe											
1/4	.375	23	.025	.325	5,600	933	.0830	.0275	1,155	3.10	.106
3/8	.500	23	.025	.450	4,200	700	.1590	.0373	1,567	5.95	.144
1/2	.625	22	.028	.569	3,763	627	.2543	.0525	2,205	9.5	.203
3/4	.875	21	.032	.811	3,072	512	.5166	.0847	3,557	19.3	.328
1	1.125	20	.035	1.055	2,613	436	.8742	.1198	5,032	32.7	.464
1 1/4	1.375	19	.042	1.291	2,566	428	1.309	.176	7,932	49.0	.681
1 1/2	1.625	18	.049	1.527	2,533	422	1.831	.243	10,206	68.5	.940
2	2.125	17	.058	2.009	2,293	382	3.170	.377	15,834	118	1.46
2 1/2	2.625	16	.065	2.495	2,080	347	4.889	.523	21,966	183	2.03
3	3.125	15	.072	2.981	1,935	323	6.979	.691	29,022	261	2.68
3 1/2	3.625	14	.083	3.459	1,923	321	9.397	.923	38,766	351	3.58
4	4.125	13	.095	3.935	1,934	322	12.161	1.20	50,400	455	4.66
5	5.125	12	.109	4.907	1,787	298	18.91	1.72	72,240	707	6.65
6	6.125	11	.120	5.885	1,646	274	27.20	2.26	94,920	1,017	8.77
Heavy Hard STREAMLINE Copper Pipe											
3/8	.500	.....	.035	.430	5,879	980	.145	.051	2,142	5.42	.198
1/2	.625	.....	.040	.545	5,376	896	.233	.074	3,108	8.71	.284
3/4	.875	.....	.045	.785	4,319	720	.484	.117	4,914	18.1	.454
1	1.125	.....	.050	1.025	3,733	622	.825	.169	7,098	30.9	.653
1 1/4	1.375	.....	.055	1.265	3,362	560	1.258	.227	9,534	47.1	.882
1 1/2	1.625	.....	.060	1.505	3,102	517	1.781	.293	12,306	66.6	1.141
2	2.125	.....	.070	1.985	2,767	461	3.097	.450	18,900	116	1.748
Extra-Heavy Hard STREAMLINE Copper Pipe											
1/4	.375	21	.032	.311	7,168	1,195	.077	.034	1,428	2.88	.134
3/8	.500	18	.049	.402	8,232	1,372	.127	.069	2,898	4.75	.269
1/2	.625	18	.049	.527	6,586	1,098	.218	.089	3,738	8.15	.344
3/4	.875	16	.065	.745	6,240	1,040	.436	.165	6,930	16.31	.641
1	1.125	16	.065	.995	4,853	809	.778	.216	9,072	29.10	.839
1 1/4	1.375	16	.065	1.245	3,971	662	1.217	.267	11,215	45.52	1.04
1 1/2	1.625	15	.072	1.481	3,722	620	1.723	.351	14,740	64.44	1.36
2	2.125	14	.083	1.959	3,281	547	3.012	.532	20,344	112.65	2.06
2 1/2	2.625	13	.095	2.435	3,040	507	4.654	.753	31,710	174.06	2.92
3	3.125	12	.109	2.907	2,930	488	6.633	1.033	43,386	248.08	4.00
3 1/2	3.625	11	.120	3.385	2,780	463	8.994	1.321	55,482	336.47	5.12
4	4.125	10	.134	3.857	2,729	455	11.678	1.680	70,560	436.76	6.51
Heavy Soft STREAMLINE Copper Pipe											
3/8	.500	.....	.035	.430	4,200	700	.145	.051	1,530	5.42	.198
1/2	.625	.....	.040	.545	3,840	640	.233	.074	2,220	8.71	.284
3/4	.875	.....	.045	.785	3,085	514	.484	.117	3,510	18.1	.454
1	1.125	.....	.050	1.025	2,668	445	.825	.169	5,070	30.9	.653
1 1/4	1.375	.....	.055	1.265	2,400	400	1.258	.227	6,810	47.1	.882
1 1/2	1.625	.....	.060	1.505	2,216	369	1.781	.293	8,790	66.6	1.141
2	2.125	.....	.070	1.985	1,977	329	3.097	.450	13,500	116	1.748
Extra-Heavy Soft STREAMLINE Copper Pipe											
1/4	.375	21	.032	.311	5,120	853	.077	.034	1,014	2.88	.134
3/8	.500	18	.049	.402	5,880	980	.127	.069	2,070	4.75	.269
1/2	.625	18	.049	.527	4,705	784	.218	.089	2,670	8.15	.344
3/4	.875	18	.049	.652	3,920	653	.334	.108	3,240	12.50	.418
1	1.125	16	.065	.745	4,458	743	.436	.165	4,950	16.31	.641
1 1/4	1.375	16	.065	.995	3,467	578	.778	.216	6,480	29.10	.839
1 1/2	1.625	15	.072	1.245	2,836	473	1.217	.267	8,010	45.52	1.04
2	2.125	14	.083	1.481	2,658	443	1.723	.351	10,530	64.44	1.36
2 1/2	2.625	13	.095	1.959	2,343	391	3.012	.532	15,960	112.65	2.06
3	3.125	12	.109	2.435	2,171	362	4.654	.755	22,650	174.06	2.92
3 1/2	3.625	11	.120	2.907	2,092	349	6.633	1.033	30,990	248.07	4.00
4	4.125	10	.134	3.385	1,986	331	8.994	1.321	39,630	336.47	5.12
				3.857	1,949	325	11.678	1.680	50,400	436.76	6.51

* Based on expression of B. P. = $\frac{2tT}{O.D.}$

** Based on water velocities of 12 ft. per second at orifice.

COPPER and BRASS PIPE and FITTINGS

STREAMLINE TRADE MARK REG. U. S. PAT. OFF. PRODUCTS

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